



RE: NMFS Comments on Brookfield White Pine Hydro's Upstream Fish Passage Alternatives Meeting Summary for the Brunswick Project (P-2284)

NMFS has reviewed the Draft Alternatives Review for upstream fish passage at the Brunswick Project. While we appreciate the preliminary analysis, we emphasize that the upstream project interaction and behavior study has not yet been completed. This study is necessary to adequately evaluate *any* upstream passage alternatives and their potential success in the context of site-specific hydraulics and fish behavior. In particular, the results from the study will be necessary to inform the design location of the fish passage entrance. The entrance location will dictate much of the subsequent design configurations regardless of the type of fish passage. As such, the comments we provide below should be considered preliminary, until such time that we are able to review and integrate the information from the upstream interaction and behavior study.

Comments on Proposed Alternatives

Alternative U1: Modification of Existing Vertical Slot Ladder

- We believe a vertical slot alternative, if properly modified, could represent a sufficient volitional passage alternative.
- We support modifications to bring the Energy Dissipation Factor (EDF) within USFWS recommendations for American shad.
- We note that while internal efficiencies may improve under this alternative, the theoretical capacity remains lower than a new facility due to smaller pool sizes.
- Although a modified design may result in improvements for American shad passage, we have no evidence that the improvement will be sufficient.

Alternative U2: New Vertical Slot Ladder (South Side)

- We have significant concerns regarding any design that necessitates a high number of turning pools within a confined area. These configurations can significantly reduce passage effectiveness, particularly for American shad.

Alternative U3: New Fish Lift (South Side)

- While often effective at other projects, fish lifts do not provide volitional access. In general, our preference remains for volitional passage alternatives, though we do recognize that a fish lift may be the best overall option at the site.

Alternative U4: New FishHeart System

- We question the logic of eliminating the "Whooshh" system as an alternative due to its experimental nature while simultaneously proposing the similarly experimental FishHeart system for consideration as an alternative. Ultimately, we have reservations about the deployment of any experimental fish passage technology within the GOM DPS for Atlantic salmon without any prior empirical, real-world information with which to assess potential effects to the species.

Alternatives Ruled Out

NMFS disagrees with the exclusion of several alternatives from the matrix:



- **Traditional Pool and Weir:** Brookfield incorrectly asserts that our agency does not prefer pool and weir fishways. Full-size Ice Harbor-type fishways (a type of pool and weir fishway) are typically one of our preferred designs. We believe this style of fishway can be effective in many circumstances and could be a potentially viable alternative here. However, as stated above, with proper modifications, believe that a vertical slot ladder is a reasonable volitional alternative to consider in this analysis.
- **Vertical Slot (North Side):** As stated above, we do not believe that "real estate" is a sufficient limiting factor to rule out a vertical slot ladder on the north side of the powerhouse, nor have you provided substantial evidence that is the case.
- **Fish Lift (North Side):** We disagree with the assertion that "real estate" or access difficulties are absolute limiting factors for a fish lift alternative at this location, nor have you provided substantial evidence that this is the case.
- **Nature-Like Fishways:** These alternatives have been eliminated without any detailed explanation or demonstration of the factors cited as reasons for their elimination. We agree that nature-like fishways typically do require a larger footprint, but you have provided no evidence that nature-like fishway designs would be impossible or even impractical at this site due to site-specific constraints. We recommend a more robust evaluation of nature-like fishway alternatives.